

1. (Once Amended) A method of monitoring at least one target substance in a biological system comprising:

- a) providing said biological system comprising said at least one target substance;
- b) labeling said at least one target substance with at least one apo metal binding protein;
- c) providing conditions which permit said at least one apo metal binding protein to emit a signal;
- d) observing or measuring the signal; and
- e) monitoring said at least one target substance based on the signal observed or measured.

2. (Unchanged) The method of claim 1, wherein said step of monitoring comprises determining the location of said at least one target substance in said biological system.

3. (Unchanged) The method of claim 1, wherein said step of monitoring comprises quantifying the amount of said at least one target substance in said biological system.

4. (Unchanged) The method of claim 1, wherein said biological system is chosen from a virus, bacteria, plant or animal.

5. (Unchanged) The method of claim 1, wherein said at least one target substance is chosen from a cell or a tissue.

6. (Unchanged) The method of claim 5, wherein said cell is chosen from a bacterial, fugal, plant or animal cell.

7. (Unchanged) The method of claim 5, wherein said cell is labeled by transfecting said cell with a DNA molecule encoding said at least one apo metal binding protein.

8. (Unchanged) The method of claim 5, wherein said cell is labeled by linking said at least one apo metal binding protein to said cell.

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9. (Unchanged) The method of claim 5, wherein said at least one apo metal binding protein is provided to said cell *in vivo*.

10. (Unchanged) The method of claim 5, wherein said at least one apo metal binding protein is provided to said cell *in vitro*.

11. ~~(Withdrawn)~~

12. (Unchanged) The method of claim 5, wherein said at least one apo metal binding protein is linked to said tissue.

13. (Unchanged) The method of claim 12, wherein said at least one target substance is a protein.

14. (Unchanged) The method of claim 7, wherein said protein is labeled by preparing a fusion protein with said protein and at least one apo metal binding protein.

15. (Unchanged) The method of claim 1, wherein said conditions which permit said at least one apo metal binding protein to emit a signal comprise providing at least one metal which binds to said at least one apo metal binding protein.

16. (Unchanged) The method of claim 1, wherein said at least one apo metal binding protein is a copper binding protein.

17. (Once Amended) The method of claim 15, wherein said apo metal binding protein is chosen from azurin, pseudo-azurin, a plastocyanin, and a phytocyanin.

18. (Unchanged) The method of claim 15, wherein said copper binding protein is blue oxidase chosen from ascorbate oxidase, ceruloplasmin, and laccase.

19. (Unchanged) The method of claim 15, wherein said copper binding protein is a nitrite reductase.

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20. (Unchanged) The method of claim 1, wherein said at least one apo metal binding protein is chosen from haemoglobin, catalase and transferrin.

21-35. (Withdrawn)

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36. (New) A method of monitoring at least one target substance in a biological system comprising:

- a) providing said biological system comprising said at least one target substance, wherein said at least one target substance is a cell that is labeled by transfecting said cell with a DNA molecule encoding said at least one apo metal binding protein;
- b) labeling said at least one target substance with at least one apo metal binding protein, wherein said apo metal binding protein is a protein capable of binding itself to said metal;
- c) providing conditions which permit said at least one apo metal binding protein to emit a signal;
- d) observing or measuring the signal; and
- e) monitoring said at least one target substance based on the signal observed or measured.

37. (New) The method of claim 36, wherein said protein is labeled by preparing a fusion protein with said protein and at least one apo metal binding protein.

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38. (New) A method of monitoring at least one target substance in a biological system comprising:

- a) providing said biological system comprising said at least one target substance;
 - b) labeling said at least one target substance with at least one apo metal binding protein, wherein said apo metal binding protein is a blue copper protein, and said blue copper protein is chosen from azurin, pseudo-azurin, a plastocyanin, and a phytocyanin;
 - c) providing conditions which permit said at least one apo metal binding protein to emit a signal, wherein said conditions which permit said at least one apo metal binding protein to emit a signal comprise providing at least one metal which binds to said at least one apo metal binding protein;
 - d) observing or measuring the signal; and
 - e) monitoring said at least one target substance based on the signal observed or measured.
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